

Maryland Department of Natural Resources Fact Sheet:

The Non-native Virile Crayfish in Maryland

History:

- The virile crayfish *Orconectes virilis* is a large crayfish native to Montana, Wyoming, the Upper Mississippi River, the Great Lakes drainages, and Hudson River.
- The adult size of the virile crayfish (5 inches in length) makes this species attractive as a food item for people and also as bait. For these reasons, the virile crayfish has been widely introduced into areas outside its native range.
- Reproducing populations of the virile crayfish have been reported in Maine, Massachusetts, Vermont, California, and Arizona. This species has also been introduced in France, Sweden, and Mexico.
- The negative effects of invasive, non-native crayfishes on ecosystems are extensive and well documented. Reductions in abundance and diversity of aquatic plants, mussels, insect larvae, snails, frogs, turtles, and native crayfishes have been associated with introductions of the virile crayfish.
- The virile crayfish was first introduced in Maryland around 1885 into the Patapsco River near Woodstock. This probably unintentional introduction may have resulted from escapees from Baltimore markets, where it was sold as a popular food item, or via bait bucket transfers.
- Meredith and Schwartz (1960) collected virile crayfish from five localities around Woodstock. A few years later, Schwartz et al. (1963) reported that this species had expanded its range to most of the Patapsco River basin. These authors also noted the subsequent loss of native crayfish species in areas where the non-native virile crayfish was present.
 - Two native crayfishes, the Appalachian brook crayfish *Cambarus bartonii* and the spinycheek crayfish *O. limosus*, historically widespread and abundant throughout the entire Patapsco River basin, were found to be confined to only a small portion of the watershed in 1963.
 - Competition between native and non-native crayfishes, along with stream degradation (pollution and habitat alteration), are thought to favor the virile crayfish. Therefore, degradation in streams throughout the Patapsco basin probably hastened the establishment of the virile crayfish and subsequent displacement of native species.

- The virile crayfish is much larger than Maryland's native species and tends to out-compete native species for hiding places (e.g., crevices under rocks), thereby making native crayfishes more vulnerable to competition and predation by other crayfishes, fishes, and other animals (e.g., raccoons).

Present day:

- MDNR's Maryland Biological Stream Survey (MBSS) has documented the spread of the virile crayfish beyond the Patapsco River basin, throughout the Piedmont region of the State, and in the Gunpowder River, Bush River, Susquehanna River, Potomac Washington Metro, Patuxent and the Middle Potomac River basins.
- The virile crayfish can survive long periods outside of water, can easily move overland from one stream to another, disperse rapidly, and colonize new areas.
- Because the native spinycheek crayfish prefers the same stream sizes and habitats as the virile crayfish, it is particularly vulnerable to competition and displacement.
- Based on MBSS records, the range of the spinycheek crayfish has decreased in Maryland, probably as a result of the expansion of the virile crayfish.
- The virile crayfish has a competitive advantage over native species due to its large size and aggressive nature. Based on MBSS data, the virile crayfish is more successful at out-competing and displacing native crayfishes in streams that are polluted or have altered habitat compared to better quality streams.
- If this trend continues, the expansion of the virile crayfish will likely result in reduced populations of native crayfishes and may lead to the complete displacement of some native crayfishes in the Piedmont region of Maryland.
- Future expansion of the virile crayfish on the Delmarva Peninsula may lead to the extirpation of the spinycheek crayfish from Maryland.
- Another non-native crayfish species, the red swamp crayfish *Procambarus clarkii*, is also found in the State. The effects of this non-native species on Maryland's stream ecosystems and native species are unknown.
- A recent introduction of the rusty crayfish *O. rusticus* into the Juniata River, a tributary to the Susquehanna River in Pennsylvania, may also pose a significant future threat to Maryland crayfishes. There are no confirmed records of this

species in Maryland. However, future expansion of the rusty crayfish into Maryland's portion of the Susquehanna River basin is likely.

- Unlike the Northern snakehead, another invasive, non-native aquatic species found in Maryland, possession and use of the virile crayfish as bait is not prohibited.
- Unlike the Northern snakehead, the negative impacts of the virile crayfish on other native species have occurred and are known. The virile crayfish has caused the loss of native crayfishes from several Maryland streams, and it is continuing to disperse into new areas where it will also probably have more negative ecological impacts.

What can people do to stop the spread?

1. The dispersal of the non-native virile crayfish has been enhanced through bait bucket transfers, either intentional or inadvertent. Responsible disposal of unused bait can prevent the continued dispersal of the virile crayfish (and many other non-native species) into new areas of Maryland.
2. Fishermen should make sure their bait suppliers are not selling virile crayfish. The use of any non-native species of crayfish, or other potentially invasive aquatic species, as bait should be avoided.
3. Land use initiatives and policies that aim to reduce stream pollution and habitat alteration should be supported. Fishermen should become involved in land use and water use issues that affect stream quality in their communities.

For more information, contact:

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